



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

MP

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/504,660	02/14/2000	William E. Hoke	07206-047001	8160

22494 7590 09/19/2002

DALY, CROWLEY & MOFFORD, LLP
SUITE 101
275 TURNPIKE STREET
CANTON, MA 02021-2310

EXAMINER

KANG, DONGHEE

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 09/19/2002

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/504,660

Applicant(s)

HOKE ET AL.

Examiner

Donghee Kang

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-15 and 18-34 is/are pending in the application.
- 4a) Of the above claim(s) 9-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Acknowledgment

1. Claims 1-8 have been cancelled and no claims are added. Thus claims 9-15 & 18-31 are pending in this application. Since, claims 9-15 are non-elected claims, they are withdrawn from further consideration.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 23, 2002 has been entered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

4. Claims **18-21, 23 & 31** are rejected under 35 U.S.C. 102(e) as being anticipated by Onda (US 6,194,747).

Art Unit: 2811

Regarding claims **18, 23, & 31**, Onda discloses a transistor comprising (Fig.1) a semi-insulating indium phosphide substrate (101) having a lattice constant; a channel layer of InGaAs (103) disposed over the substrate, the channel layer having a lattice constant different from the lattice constant of the substrate; a Schottky layer of InAlAs (106) disposed over the channel layer, the schottky layer having a lattice constant different from the lattice constant of the substrate; a first cap layer (107) disposed over the schottky layer; a contact layer (108) disposed over the first cap layer, the contact layer having a first recess therein, such first recess having a bottom surface terminating in a top surface of the first cap layer; a second recess having sidewalls in the first cap layer and the schottky layer, such second recess having a bottom surface terminating in the schottky layer; a source electrode (109b) in ohmic contact with the contact layer; a drain electrode (109c) in ohmic contact with the contact layer; and a gate electrode (109a) in schottky contact with the schottky layer.

Onda does not clearly teach the first cap layer is a resistive layer. However it is acknowledged that a first cap layer (107) of Onda would very well meet the recited term "resistive layer" and are precisely the same material and performs the same function as applicant's claimed "resistive layer".

Regarding claims **19-21**, Although Onda does not teach the lattice constant of the schottky layer is smaller than the lattice constant of the substrate and the lattice constant of the channel layer is larger than the lattice constant of the substrate, this feature is inherent in Onda's device because the structure and materials of Onda's device are identical to the claimed structure.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims **22, 24-30 & 34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Onda (US 6,194,747).

Onda applies to claim 18 explained above.

Regarding claim **22**, Onda does not teach the concentration of Indium in the schottky and channel layer. However, the selection of concentration of various layers in device is an obvious design choice, since it has held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skills in the art. *In re Aller*, 105 USPQ 233.

Regarding claims **24-26 & 28-29**, Onda teaches the schottky layer comprises InAlAs and the channel layer comprises InGaAs. However, Onda does not teach the concentration of In, Al, and Ga. The selection of concentration of various layers in device is an obvious design choice, since it has held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skills in the art. *In re Aller*, 105 USPQ 233.

Regarding claims **27 & 30**, Onda discloses all claimed invention, as applied to claim 18 above, except that the indium concentration of the channel layer and Schottky layer. However, the selection of concentration of various layers in device is an obvious

design choice, since it has held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skills in the art. *In re Aller*, 105 USPQ 233.

Regarding claim **34**, Onda teaches the first cap layer comprises InAlAs and the contact layer comprises InGaAs. However, Onda does not teach specific ratio between In and Al or Ga. The selection of concentration of various layers in device is an obvious design choice, since it has held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skills in the art. *In re Aller*, 105 USPQ 233.

7. Claims **32-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Onda in view of Hur et al. ("Ultralinear Doubled Pulse doped AlInAs/GaInAs/InP HEMTs", Electronic Lett., IEE Stevenage, GB, Vol.32, No.16, August 1, 1996, pages 1516-1518).

Onda applies to claim 31 explained above.

Regarding claim **32**, Onda does not teach the transistor further comprising a first doped layer and second doped layer. However, Hur et al. teaches in Fig.1 a first Si pulse doped layer and a second Si pulse layer. Thus, it would have been obvious for one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Hur et al. into the Onda's device, since the pulse doping profiles have been optimized to yield the broad constant region of transconductance with respect to gate-to-source bias.

Regarding claim **33**, neither Onda nor Hur et al. teaches a silicon doping concentration of the first and second doped layers. However, the selection of concentration of various layers in a device is an obvious design choice, since it has held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skills in the art. *In re Aller*, 105 USPQ 233.

Response to Arguments

8. Applicant's arguments filed February 11, 2002 have been fully considered but they are not persuasive.

Applicant submitted a declaration under 37 CFR 1.131 to remove Onda as a reference.

However, the declaration under 37 CFR 1.132 filed February 11, 2002 is insufficient to overcome the rejection of claims 18-34 based upon 35 U.S.C. 102 (e) and 35 USC 103 (a) as set forth in the last Office action because: the disclosure document entitled "High Breakdown Voltage, Strain Compensated AlInAs/GaInAs/InP HEMTs" does not show a structure identical to that of Fig.5 of the present invention. For example, the present claimed invention (Fig.5) comprises "*the contact layer having a first recess therein, such first recess having a bottom surface terminating in a top surface of the resistive layer*". However, Fig.1 of the disclosure document shows the bottom surface of the first recess formed in the contact layer is not terminated in a top surface of the resistive layer.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang, Ph.D.
September 14, 2002

Steven Loke
Primary Examiner

